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A BIOLOGICAL RECONNAISSANCE OF OKEFINOKEE SWAMP: THE BIRDS.

Plates XIV-XX.

BY ALBERT H. WRIGHT AND FRANCIS HARPER.

THE famous Okefinokee, 'the greatest natural wonder' of Georgia, and 'one of the least known areas of its size in the eastern United States,' covers parts of Charlton, Ware, Clinch, and Pierce Counties, and extends a little beyond the Florida line. It is about 39 miles in greatest length by 26 miles in greatest width, and occupies some 660 square miles. Among the fresh-water swamps east of the Mississippi, it is exceeded in size only by the Everglades; and in the richness of its historical and literary associations, in its diversified topography, in the marvelous beauty and charm of its interior, and in its extraordinary interest as a faunal and floral area, Okefinokee Swamp is unique.

HISTORY.

A volume might be written concerning the history of the Okefinokee, of which we shall give here only the briefest abstract. From very early times this swamp has been the subject of strange legends and fanciful speculation. As long ago as 1682 it appeared on a map¹ as a 'Lacus Mag[nus]' at the source of the St. Mary's River (Rio de May), and in 1776 it was represented² as the 'Great

¹ Winsor, J. Narr. & Crit. Hist. America. Vol. IV, 1884, p. 227.

² The American Military Atlas, 1776, Map 5.

Swamp Owaquaphenoga,' its boundaries reaching almost to the Flint River. This was the heart of the country of the Lower Creeks and Seminoles, who enshrouded the swamp with mystery and peopled it with an immortal race which neither they nor the Spaniards could conquer. In Bartram's well-known account¹ of this pleasing legend, one of the islands in the swamp is represented as 'a most blissful spot of the earth; . . . it is inhabited by a peculiar race of Indians, whose women are incomparably beautiful,' and are called 'daughters of the sun.'

The Okefinokee has repeatedly served as a refuge for non-combatants or the weaker side in wars. During the Revolution some Indians who were unwilling to take part in the war settled here. In the Seminole or Florida War it proved an almost impregnable fastness for the Creeks and Seminoles. At this period a number of the places in the swamp and its vicinity received their present names, e. g., Billy's Island and Billy's Lake (after Billy Bowlegs, a Seminole chief), and Floyd's Island (after Gen. John Floyd, who dislodged some Indians from this island). In the Civil War Confederate deserters sought its protection, and even to-day miscreants flee here to evade the arm of justice.

The swamp has been the subject of untold memorials and petitions on behalf of the legislatures and the officials of Florida and Georgia. In 1800 the first good boundary line between these two states was established by Ellicott, and his famous mound in the southeastern corner of the swamp is not yet entirely obliterated. In 1829, in 1850 (approximately), and finally in 1879, the Okefinokee commanded attention because of a projected ship canal connecting the Atlantic Ocean with the Gulf. At the last date a careful survey of its confines was made for the federal government. It was proposed to send feeders for the canal into the swamp, and the canal itself was to pierce its southern part.

Of drainage investigations and commercial operations in the swamp, a few excerpts from McCallie's 'Drainage Situation in Georgia'² will suffice to furnish an account. He speaks first of 'Col. R. L. Hunter's survey of the Okefinokee Swamp, made in 1856-7 . . . , with a view of ascertaining the practicability of its

¹ Bartram. Wm. Travels, etc. Phila., 1791, p. 25.

² McCallie, S. W. Bull. 25, Geol. Survey of Ga., 1911, pp. 14-18.

drainage, the cost of the same, etc. . . . There was furnished to the Governor a map of the swamp, with the elevation around the whole swamp and lines of ditches, which it was estimated would drain the swamp at a cost of \$1,067,250. . . .

'On November 4, 1875, by direction of Governor J. M. Smith, the party of the Geological Survey operating in Southern Georgia joined the "Constitution Expedition," organized by the proprietors of the paper of that name in Atlanta, and remained until December 14th. A line of levels was run by Mr. C. A. Locke, engineer of the "survey," from Mixon's Ferry on Suwanee River to Trader's Hill on St. Mary's, . . .

'In 1889, the Okefinokee Swamp, or that part of it owned by the state of Georgia, comprising an area of 380 square miles, was purchased by the Suwanee Canal Company at 26½ cents per acre. The object of this company in acquiring the swamp was, first, to utilize the timber which was known to exist therein in large quantities, and subsequently to drain the swamp and use the lands for agricultural purposes. With these objects in view, the canal company began, in September, 1891, the construction of a canal from St. Mary's River to the swamp, a distance of about six miles. Later this canal, which was 45 feet wide and six feet deep, was continued into the swamp for something like 12 miles. . . . The Suwanee Canal Company, under the presidency of Captain Henry Jackson, of Atlanta, was successful in winning a large amount of cypress and other timber from the eastern side of the swamp, but operations were discontinued before the canal was sufficiently completed to have but little effect in draining the swamp as a whole. The large holdings of the Suwanee Canal Company have, within the last two or three years, been acquired by the Hebard Lumber Company, which is at present engaged in cutting and preparing for market the timber in the large cypress forest on the northwestern margin of the swamp.'

Few men of scientific interests or training have ever entered the swamp, and still fewer have traversed or explored any considerable part of it. Paul Fountain, in his 'Great Deserts and Forests of North America,' speaks of visiting it in 1871 and 1876, but his description is so far from what would be expected of one who had been in the interior, that it is extremely doubtful if he saw more than the borders of the swamp.

Doubtless the first ornithologist to see the real Okefinokee was Mr. C. F. Batchelder, who, about twenty-five years ago, entered on the eastern side and went as far as Black Jack Island, where he remained a day or two.

Maurice Thompson's writings contain some interesting references to the Okefinokee. His observations on the nesting of the Ivory-billed Woodpecker, so delightfully described in 'A Red-headed Family,'¹ were made 'in one of those shallow cypress lakes of which the larger part of the Okefinokee region is formed'; and he remarks further that 'Near by, to the westward, lay one of those great gloomy swamps, so common in southeastern Georgia, so repellant and yet so fascinating, so full of interest to the naturalist, and yet so little explored.' What appear to have been later experiences with the Ivorybill in the same locality are recounted in 'An Archer's Sojourn in the Okefinokee.'² In this paper, however, he states that his *locus* was exactly twenty miles southeast from Blackshear, Ga., on a branch of the Satilla; and this places it in or near an area sometimes known as Little Okefinokee Swamp, which is entirely separate from the real Okefinokee, and miles distant from it. In 'My Winter Garden,'³ also, Thompson speaks casually of having been 'deep in the Okefinokee'; and yet it is almost inconceivable that he could have seen for himself the marvels of the swamp's interior without treating them extensively with his gifted pen.

In August, 1902, R. M. Harper and P. L. Ricker spent two days in the swamp, devoting their attention chiefly to botanical exploration. They traversed the whole length of the canal and made a side trip to Bugaboo Island. The former has published the most complete account⁴ of the swamp that has yet appeared. Not only this article but also Dr. Harper's notes on the plants have helped us in the preparation of the present paper.

Prof. Albert M. Reese, while studying the breeding habits of the alligator, visited the Okefinokee in the summers of 1905 and 1906, on the second occasion 'penetrating the swamp to its centre.'⁵

¹ Thompson, Maurice. *By-ways and Bird Notes*. New York, 1885, pp. 23-39.

² ———. *Atlantic Monthly*, LXXVII, April, 1896, pp. 486-491.

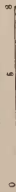
³ ———. *My Winter Garden*. New York, 1900, p. 222.

⁴ Harper, R. M. *Okefinokee Swamp*. *Popular Science Monthly*, LXXIV, June, 1909, pp. 596-614.

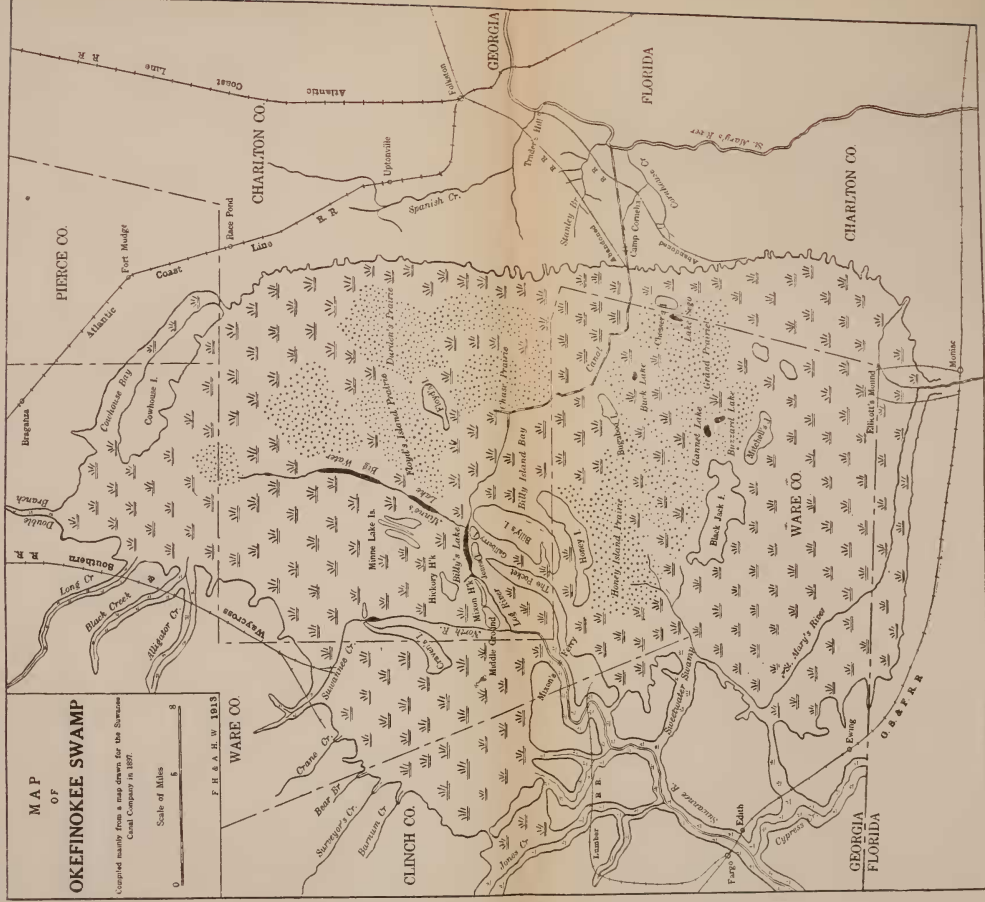
⁵ Reese, A. M., Smith. *Misc. Colls.*, XLVIII, 1907, Quart. Issue, Vol. III, Part 4, pp. 381, 382.

OKEFINOKEE SWAMP

Scale of Mules



WARE CO.



The Soil Survey of the Waycross Area, published by the U. S. Department of Agriculture in April, 1907, contains a fairly good description of the northern end of the swamp.

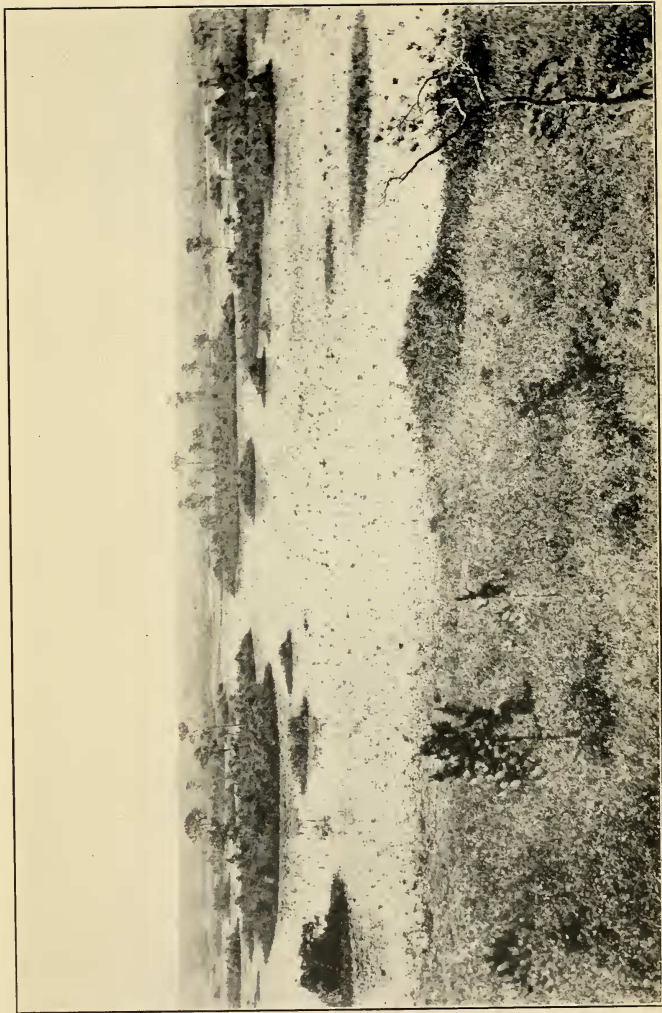
Prof. J. M. Reade, of the University of Georgia, and Mr. Huron Smith, of the Field Museum of Natural History, both Cornellians, entered the swamp by way of the canal in December, 1909, and made botanical investigations during a stay of a week.

Our own observations covered most of the period from May 6 to July 13, 1912. On the first-mentioned date Harper, with David Lee as guide, entered the swamp by way of Suwannee Creek on the northwestern side, but finding the route practically impassable after the first few miles, they made a detour through Waycross and Braganza to the northeastern side. Setting out again by boat from Cowhouse Island on the morning of May 8, they reached Billy's Island that night, meanwhile having passed through the Big Water, Minne's Lake, and the eastern end of Billy's Lake. During the next fortnight, with Billy's Island as a starting point, trips were made to Mixon's Hammock, Honey Island, the canal and Chase Prairie, Floyd's Island Prairie, and Floyd's Island. An effort to reach the Minne Lake Islands was also made, but failed. On May 23 they departed from the swamp, as they had entered, by way of Cowhouse Island.

On May 28 the Cornell University Expedition proceeded from Fargo on the southwestern side of the swamp. The party included Professors J. C. Bradley and C. R. Crosby, of the Dept. of Entomology, Dr. A. H. Wright, of the Dept. of Zoölogy, S. C. Bishop and M. D. Leonard of the class of 1913, Headmaster W. D. Funkhouser of the Ithaca High School, and Paul Battle, of Bainbridge, Ga. Mr. E. L. Worsham, State Entomologist of Georgia, and Mr. C. S. Spooner, Asst. State Entomologist, accompanied the party during the first week, and to them we are indebted for several favors. Professor Bradley had made previously (1909, 1910, and 1911) brief reconnaissances on the eastern (Suwannee Canal) and northwestern (Suwannee Creek) borders of the Okefinokee. From Fargo, the party was transported on a lumber tramway to a point about two miles from Mixon's Ferry. Thereupon, with guides whom Mr. R. W. Bennett, of the Fargo Land Company, had kindly secured for us, we began a walk of ten or twelve miles over corduroy

roads, sometimes waist-deep, to Billy's Island, where camp headquarters were established. The route from Fargo to the camp, by way of Mixon's Ferry, the Pocket, Jones Island, and Gallberry Island, was frequently traversed. Billy's Island, Billy's Lake, and Mixon's Hammock were quite thoroughly explored. Honey Island, Honey Island Prairie, Floyd's Island Prairie, and Floyd's Island were visited for periods covering from one to three days. A special trip was made to a heronry between Fargo and Mixon's Ferry. Two attempts were made to reach the Minne Lake Islands, the first from Minne's Lake due west, and the second from Billy's Lake due north. The entire party was successful in making the second trip. On July 13 we left the swamp, coming out by way of Billy's Lake, Log River, and Suwannee River to Mixon's Ferry — a course frequently explored during our sojourn in the swamp.

A few words should be said here concerning the Lee family of Billy's Island, to whom we are indebted for much valuable information concerning the Okefinokee and its natural history. Throughout our stay in the swamp we were in daily contact with these people, and employed four of the men as guides. The family settled here about thirty years ago, and have remained the only permanent inhabitants of the swamp's remote interior. (Two other families, long known as inhabitants of the swamp, are the Mixons on the western, and the Chessers on the eastern borders.) During their long residence in the heart of the swamp the Lees have gained an unusually intimate acquaintance with the various forms of its plant and animal life. They not only have names for practically all the birds except some of the smaller and less distinctive *Passeres*, but could also give interesting and very trustworthy accounts of their habits. They are likewise familiar with most of the other vertebrates. Their knowledge of the plants of the swamp is scarcely less full; and there were few species that they could not name for us. While most of their local names are either exactly or recognizably similar to those in general use in the South, others appear to be altogether unique; and we consider them all of such interest as to be worthy of inclusion in the annotated list of species.



CHASE PRAIRIE, WITH PINE 'HEADS.'

HABITATS.

In the eastern United States few, if any, areas of equal extent afford such exceptional opportunities for the study of animal life in a primeval state as does Okefinokee Swamp. Handicapped as we were by time and the difficulties of exploration, we can make this report only a preliminary survey of ecological conditions which might well occupy years of immediate and attentive study, before the commercial encroachments destroy this paradise for the present-day naturalist.

As R. M. Harper¹ has pointed out, 'The various aspects of different parts of Okefinokee Swamp seem to depend almost entirely on the distance of the sandy bottom below or above the water level.' The swamp may be divided conveniently into four major ecological divisions: the islands, the cypress 'bays,' the prairies, and the watercourses. The cypress 'bays' and the prairies are probably about equal in area, and cover by far the greater part of the swamp. A glance at the map (Plate I) will show the extent of the islands and the more important prairies. Though all of the swamp, exclusive of the islands, is inundated, the smallest of the four divisions is the open watercourses.

The islands. These are covered for the most part with pine barrens (Plate XVII). The long-leaf pine (*Pinus palustris*) predominates in the drier areas, and the slash pine (*P. Elliottii*) in the more moist situations. Beneath the pines is an abundant and practically continuous growth of saw-palmetto (*Screnoa serrulata*). Intermixed with it is a heath (Ericaceae) society, composed of several species of huckleberries (*Gaylussacia*) and blueberries (*Vaccinium*), 'poor grub' (*Xolisma ferruginea*), 'gallberry' (*Ilex glabra*), and 'calico bush' (*Kalmia hirsuta*). The huckleberries and blueberries grow in the utmost profusion, and form an important element in the food of many birds and mammals. A third and lower group of plants consists of sedges and other small herbs. The islands are so flat and rise so slightly above the level of the swamp, that there is very little drainage; and after rains the sandy soil is covered with water in many places. Over the limited

¹ *Loc. cit.*, p. 606.

land surface crawl numerous snakes, among which may be mentioned the spreading adder (*Heterodon platyrhinus*), black snake (*Zamenis constrictor*), king snake (*Ophibolus getulus*), and three species of rattlesnakes (*Crotalus adamanteus*, *C. horridus*, and *Sistrurus miliaris*). The Florida terrapin (*Chrysemys floridana*) and the southern soft-shelled turtle (*Trionyx ferox*) come upon the islands in large numbers to deposit their eggs, which furnish a much-prized article of diet for the predaceous mammals, such as the opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Florida bear (*Ursus floridanus*) skunk (*Mephitis elongata*), and wild cat (*Lynx ruffus*). That the ground-loving birds maintain themselves while so many enemies are rampant in these restricted quarters, is surprising. Furthermore, some of the islands are often burnt over by the residents or by hunters in order to improve the grazing or to facilitate hunting. Among the birds that are most typical of this habitat and show a decided preference for it, are the Bob-white, Red-cockaded Woodpecker, Wood Pewee, Florida Blue Jay, Southern Meadowlark, Pine-woods Sparrow, White-eyed Towhee, Summer Tanager, Pine Warbler, Brown-headed Nuthatch, and Bluebird. The Sandhill Crane, Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Southern Hairy Woodpecker, Pileated Woodpecker, Red-headed Woodpecker, Red-bellied Woodpecker, Kingbird, Crested Flycatcher, Yellow-throated Warbler, Carolina Wren, and Florida White-breasted Nuthatch also occur here (and most of them commonly), but at the same time are found in greater or less numbers elsewhere within the swamp.

The pine barrens surrounding the swamp bear a general resemblance in topography and vegetation to those on the islands, but are for the most part somewhat higher and drier. They have suffered much from the lumbering and turpentine industries. Among the birds, the Wild Turkey, Mourning Dove, Sparrow Hawk, Southern Hairy Woodpecker, Flicker, Chuck-will's-widow, Nighthawk, Purple Martin, and Brown Thrasher appear to be more common in the environs than in the pine barrens within the swamp. Among the other groups, it is asserted that such forms as the gray fox (*Urocyon cinereoargenteus*), 'salamander' (*Geomys*), and coachwhip snake (*Zamenis flagellum*) do not reach the Okefinokee islands. An intensive study and comparison of the two faunas would doubtless reveal other interesting differences.

The hammocks occupy practically the whole of some of the smaller islands, and the borders of some of the larger ones (Plate XX). The tree growth here consists of such species as 'spruce pine' (*Pinus Tæda*) 'live oak' (*Quercus geminata?*), 'water oak' (*Quercus nigra*), 'loblolly' (*Magnolia grandiflora*), 'sweet bay' (*Persea pubescens*), and sweet gum (*Liquidamber Styraciflua*). Saw-palmetto forms a conspicuous part of the undergrowth. The Pileated Woodpecker, Red-bellied Woodpecker, Crested Flycatcher, Acadian Flycatcher, Cardinal, Hooded Warbler, and Carolina Wren are the common birds of this habitat; it is noteworthy, however, that none of them are confined to it. Our few records of the Red-eyed Vireo within the swamp were made in the hammock on Billy's Island.

Cypress 'bays.' (Plates XX and XVIII.) The dominant plant growth of the 'bays' is the pond cypress (*Taxodium imbricarium*); and probably nowhere else in the world does it attain a heavier growth or finer proportions. The river cypress (*T. distichum*) also is found in some places, especially along the lakes and 'runs.' Among other important trees are the black gum (*Nyssa sylvatica*), red bay (*Gordonia Lasianthus*), white bay (*Magnolia virginiana*), and sweet bay (*Persea pubescens*). The red maple (*Acer rubrum*) is less common. From the trees hang great festoons of Spanish 'moss' (*Tillandsia usneoides*). The undergrowth consists of such plants as the 'hurrah bushes' (*Pieris nitida* and *Leucothoë racemosa*), 'gallberry' and other shrubs, tall ferns (*Lorinseria* and *Osmunda*), and poison ivy (*Rhus radicans*). In many places the 'bamboo vine' (*Smilax laurifolia*) and the muscadine (*Vitis rotundifolia*) bind the undergrowth into an impenetrable tangle. As a general rule, these shrubs and vines are more abundant at the edges of the 'bays' along the watercourses, where they receive more sunlight than within the depths of the cypress forests. During our stay the water in the 'bays' stood at an average depth of several feet, but in drier seasons this depth is greatly reduced and the underlying muck is exposed over large areas.

The southern gray squirrel (*Sciurus carolinensis*), raccoon, Florida bear, and wild cat are at home in the cypress 'bays.' The pied water snake (*Natrix taxispilota*) and the cottonmouth (*Incis-trodon piscivorous*) drop from the bushes along the 'runs' as one

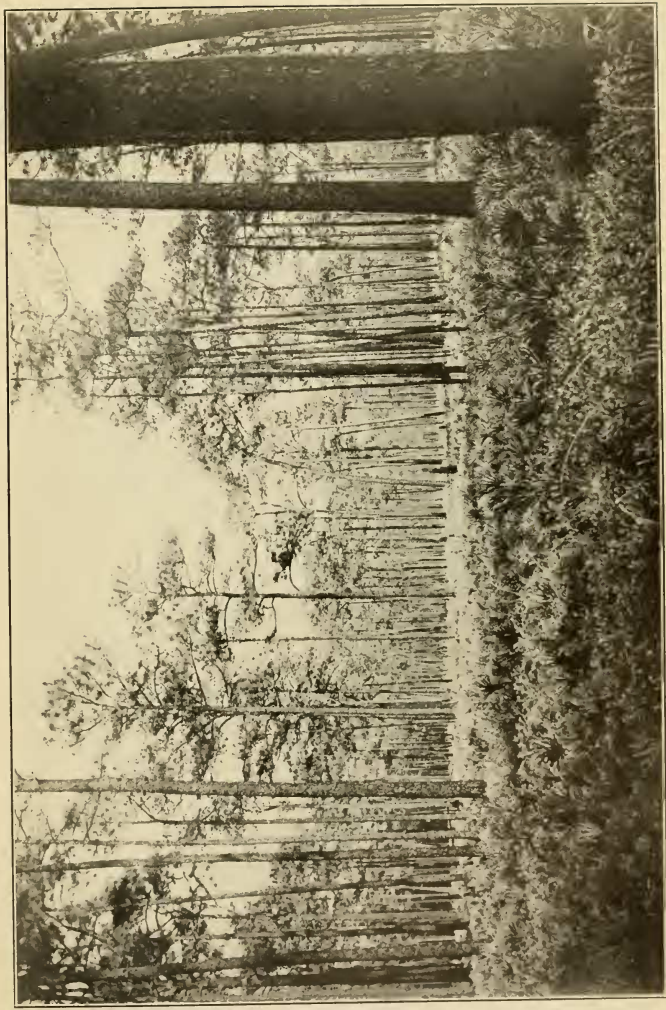
paddles by. The birds most typical of this habitat are the Florida Barred Owl, White-eyed Vireo, Prothonotary Warbler, Swainson's Warbler, and Parula Warbler. Others that are not confined to the cypress 'bays,' but are more common here than in any other habitat, are the Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Pileated Woodpecker, Acadian Flycatcher, Cardinal, Carolina Wren, Tufted Titmouse, and Carolina Chickadee. Among the more generally distributed forms that occur here in numbers are the Red-bellied Woodpecker, Crested Flycatcher, Yellow-throated Warbler, Hooded Warbler, and Florida White-breasted Nuthatch.

There are several minor ecological divisions that bear more or less resemblance to the cypress 'bays.' These are the cypress ponds, sphagnous bogs, and prairie 'heads.'

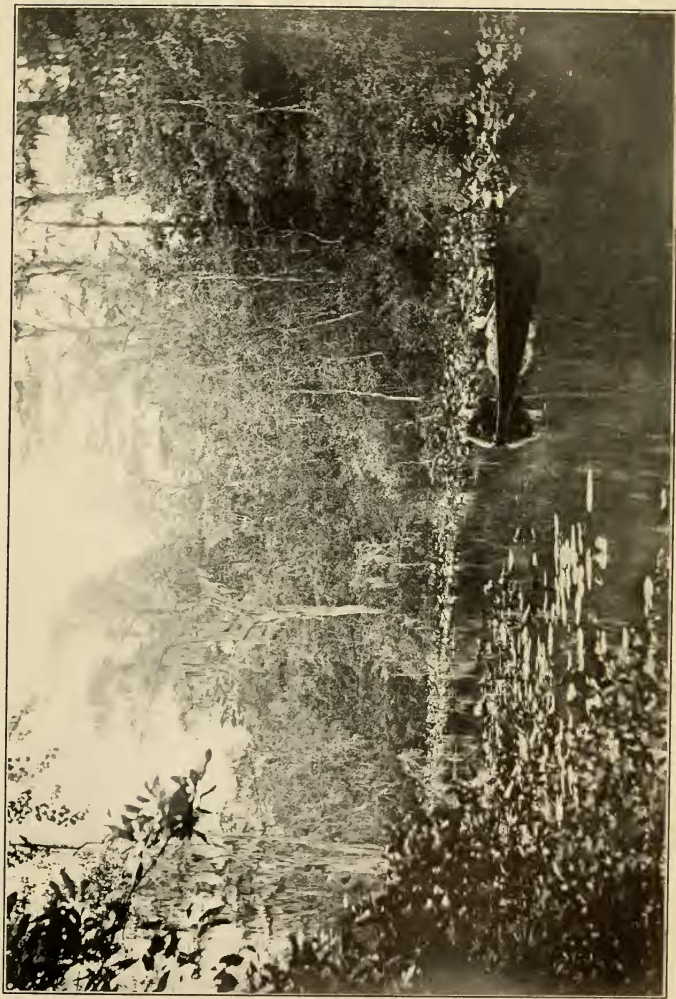
Within the larger islands are many small cypress ponds, generally of only an acre or two in extent. (Plate XIX.) They do not differ greatly from the cypress 'bays,' although the trees are not so close together and the undergrowth is for the most part confined to the edges. Frequently an alligator makes this its haunt. Practically every one of the ponds furnishes a home for a pair of Prothonotary Warblers and for a pair of Florida Yellowthroats as well. The flocks of Florida Grackles are found most commonly here, and the Carolina Chickadee is frequently noted. The Wood Ibis also is said to feed in these ponds.

In some cases the cypress 'bays' directly adjoin the islands. A number of islands, on the other hand, are enclosed by sphagnous bogs of varying width, beyond which lie the prairies. In the bogs the cypresses are smaller and grow much more openly than in the 'bays'; the slash pine also is common. The plants of the undergrowth, which is extraordinarily thick, are much the same here as in the 'bays,' but they also include the pitcher plants (*Sarracenia minor* and *S. psittacina*). A dense bed of sphagnum, which sways and quivers underfoot, rests upon the water and muck. Some of the prairie 'heads,' (Plate XVI), in which slash pines replace the cypresses, and where the sphagnum grows in great profusion, may also be included in this division. Our observations in this habitat, though very limited, apparently show that the bird species are far from numerous.

The cypress 'heads' or 'houses' (Plate XIV) on the prairies vary



PINE BARRENS ON BILLY'S ISLAND.



MINNE'S LAKE AND BORDERING CYPRESS 'BAY.'

in size from a clump of a few trees to areas of a mile or more in extent, the latter differing little, if at all, from the cypress 'bays.' The smaller 'heads' are generally covered with buttonbushes (*Cephalanthus occidentalis*), 'hardwood' (*Cyrilla racemiflora*), white alders (*Clethra alnifolia*), 'hurrah bushes,' and 'bamboo vines'; and enclosed within this shrubby tangle are white bays sweet bays, and a few taller cypresses. Some islets of this sort contain ground dry enough to furnish camping sites. The Yellow-billed Cuckoo, Kingbird, Florida Grackle, Yellow-throated Warbler, Florida Yellow-throat, and Carolina Wren are common here. We also found the Water-Turkey, Ward's Heron, and the Fish Hawk nesting in these 'heads.'

Prairies. (Plate XVI.) The 'prairies' of the Okefinokee are by no means prairies in the ordinary sense of the term. One prairie may differ considerably from another, but all are essentially flooded marshes, or shallow lakes filled to a great extent with aquatic vegetation. In wet seasons one may pole his boat almost at will over these expanses; during dry summers, however, the muck is exposed, and little water is left except in the deeper parts, such as the 'gator holes.' On Floyd's Island Prairie the water is so shallow, even during the wettest seasons, and the sphagnum and other aquatic plants grow so profusely, that navigation is extremely difficult, if not impossible, over a large portion of this area. The plants of the prairies have their roots in the underlying muck, which in turn rests upon a sandy bottom. The vegetation is arranged in several distinct zones. In the deeper and more open parts, the species of greatest abundance and most widespread distribution is the white water-lily (*Castalia odorata*). Interspersed with it are arrow-head (*Sagittaria*), 'wampee' (*Pontederia cordata*), 'bull-tongue' (*Orontium aquaticum*), arrow arum (*Peltandra*), and other characteristic aquatic herbs. Here and there the water-lilies are replaced by purple bladderworts (*Utricularia purpurea*), upon the seeds of which raccoons and winter Ducks feed regularly. In the shallower parts, thick beds of 'maiden cane' grow. This zone is especially noticeable around the edges of some of the cypress 'heads,' the shrubs and trees of which rise in succession behind it. Saw-grass, also, grows with the 'maiden cane' in some small open glades (which may be likened to prairies) within the cypress 'bay' north of Billy's Lake.

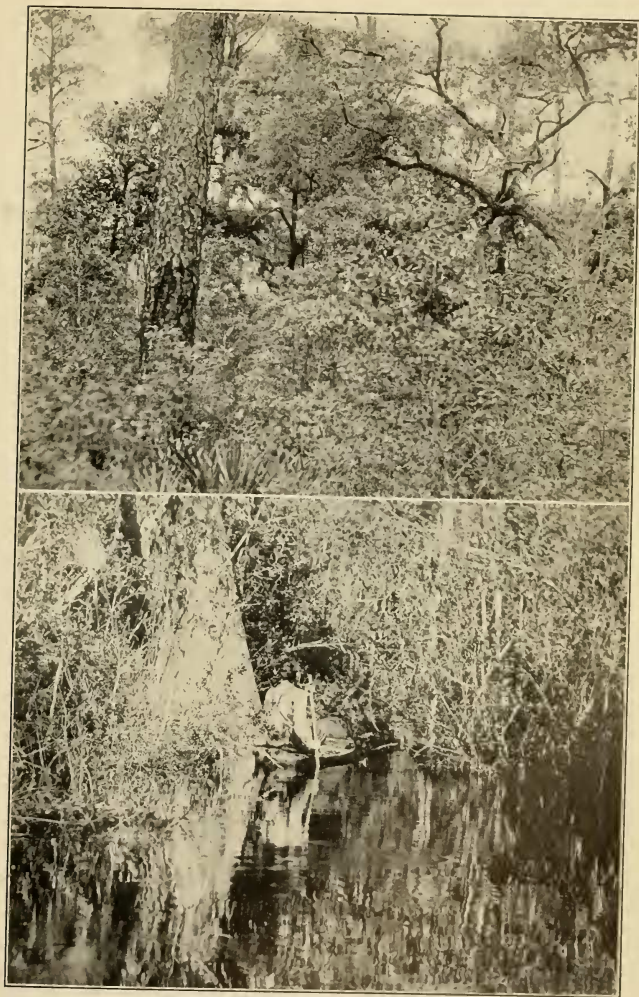
The bears wander from 'head' to 'head' across the prairies, and in the sphagnum bordering the 'heads' are seen the trails, or so-called 'slides,' of otters (*Lutra hudsonica*). Among the water-lilies abound ribbon snakes (*Eutania sackenii*), killifishes (*Fundulus* and *Gambusia*), and several species of frogs (*Chorophilus*, *Acris*, *Hyla* and *Rana*), whose evening chorus is one of the features of the swamp. In some of the deeper parts, which are either naturally free of vegetation or kept clear by alligators (*Alligator mississippiensis*) and hence called "'gator holes"—there are also southern soft-shelled turtles and warmouths (*Chanobryttus gulosus*). These parts are a foraging ground for the Water-Turkey, Wood Duck, and Fish Hawk. Ward's Heron, the American Egret, the Little Blue Heron, the Green Heron, and the Sandhill Crane feed where the water is not too deep, and in dry seasons these and other waders doubtless occur on the prairies in much larger numbers than we found them during the period of exceptionally high water in 1912. The Florida Redwing nests here among the aquatic plants rising above the surface.

Watercourses. (Plate XVIII.) This habitat may be considered to include all the bodies of open water in the swamp, among which may be mentioned Billy's Lake, Minne's Lake, the Big Water, the abandoned logging canal, Buzzard Lake, Gannet Lake, and the upper courses of the Suwannee River. (See map.) The surface of the water in the swamp varies in level as much as 15 feet between various points. Consequently, throughout most of the swamp there is a perceptible current in the direction of the Suwannee River; it is especially noticeable in the narrow 'runs' or water trails that afford the only means of traversing the cypress 'bays' by boat. Most of the lakes are simply wider and deeper parts of these 'runs'; and Billy's Lake, the largest body of water in the Okefinokee, is probably not over a hundred yards in its greatest width. (The width of some of the lakes is unavoidably exaggerated in the map.) Yellow water-lilies or 'bonnets' (*Nymphaea macrophylla*) form an abundant and characteristic growth in the 'runs' and along the borders of the lakes; the swamp loose-strife (*Decodon verticillata*) and purple bladderwort (*Utricularia purpurea*) are also found here.

Some of the characteristic vertebrate forms of the water courses



A CYPRESS POND ON BILLY'S ISLAND.



1. HAMMOCK ON FLOYD'S ISLAND.
2. A RUN THROUGH A CYPRESS BAY (BILLY ISLAND BAY).

are the pied water snake, pilot snake (*Coluber obsoletus*), southern soft shelled turtle, alligator snapper (*Macrochelys lacertina*), alligator, large-mouthed black bass (*Micropterus salmoides*), warmouth, and other basses (Centrarchidae), two pickerels (*Esox americanus* and *E. reticulatus*), and various catfishes (*Ameiurus*) and killifishes. The summer birds of this habitat are few in number, including only the Water-Turkey, Wood Duck, and Fish Hawk. The Chimney Swift, which skims low over the surface, may also be mentioned. In the winter, when Coots and various species of Ducks arrive from the north, the numbers of water birds are considerably augmented.

The close affinity of the Okefinokee avifauna with that of the Florida peninsula is shown by the presence of such birds as Ward's Heron, the Limpkin, the Florida Blue Jay, and the Florida Red-wing. The last two, while intermediate between the typical species and the subspecies, are distinctly referable to the Florida form. The same statement could very likely be made concerning the Night-hawk if we had secured specimens. Other birds of the swamp whose ranges extend only slightly further north along the Atlantic coast are the Sandhill Crane, Florida Red-shouldered Hawk, Florida Barred Owl, Florida Grackle, Pine-woods Sparrow, White-eyed Towhee, and Florida White-breasted Nuthatch. In contrast to the Blue Jay and the Red-wing, the Bob-white of the Okefinokee belongs decidedly to the northern form, though the specimens show some slight tendencies toward the characters of *Colinus virginianus floridanus*.

LIST OF SPECIES OBSERVED.

1. **Anhinga anhinga.** WATER-TURKEY.—These birds are common on some of the larger waterways of the Okefinokee. They seem to be congregated chiefly along the Big Water and on the Suwannee River, where single birds or small groups were frequently seen soaring high in the air. On Billy's Lake a few were observed. In some years they have nested at the north end of Minne's Lake. On May 21 a colony of three or four nests was located in a cypress head on Floyd's Island Prairie. Curiously enough, the birds were sitting on empty nests, and a broken egg-shell halfway down one of the cypress saplings was the only material evidence of breeding. No eggs were found when the same place was visited on June 27. Sometimes the Water-Turkeys nest in isolated pairs, and at

other times in the heronries. On June 18 a nest was found about five feet above the water in a buttonbush (*Cephalanthus occidentalis*). It consisted of a platform of sticks, larger and more compact than the surrounding nests of the Little Blue Heron. On the edge of this dung-covered nest four young were resting. The old bird perched in a pine tree at a distance, and did not approach while we were present.

The natives say that this species sometimes gorges itself to such an extent that it becomes unable to fly, and can make its escape only by the water. At the approach of our boat in the Minne Lake Run, a Water-Turkey plunged head foremost from its perch and disappeared, though indicating its swift course beneath the surface by the shaking bonnet stems. A bird alternately flapping and sailing across a bit of bonnet-strewn prairie, against a background of moss-hung cypresses, presents a striking and beautiful spectacle.

A Water-Turkey's bill is no mean weapon, as attested by the blind eye of one of the native boys, who received a thrust from a tame bird.

2. **Aix sponsa.** WOOD DUCK; 'Squealer'; 'Summer Duck'.—The Wood Duck is still found in considerable numbers on the lakes, streams, and flooded prairies of Okefinokee. It is apparently the sole summer resident of its tribe in the swamp, for the Florida Duck is unknown there. The Big Water and Honey Island Prairie are especially favored haunts. Several broods of young were observed in late May and early June. At such times they are often found in flocks as large as eight to sixteen. They eluded our pursuit by swiftly scurrying along the bushy borders of cypress 'heads.' The natives not infrequently capture the tender, half-grown young with dogs, and eat them with considerable relish. We were shown a hole in a dead pine on Billy's Island where both the Wood Duck and the Pileated Woodpecker had nested at different times. After the nesting is over and the young can fly, the Wood Ducks are said to betake themselves in considerable numbers to particular spots in the prairies, such as the southern part of Floyd's Island Prairie, where they associate with the Hooded Mergansers ('Frog Ducks'), but remain apart from the other Ducks of the fall and winter. The shrill little whistle of the male is very distinct from the louder and comparatively hoarse quack of the female.

3. **Guara alba.** WHITE IBIS; 'Curléw'; 'White Curléw'.—The White Ibis is reported as quite common in the swamp, but our own records are not numerous. Eight or nine birds were seen flying over the northern part of the swamp on May 8. On June 19 we observed three 'Curlews' flying high over Billy's Lake. A week later a flock of eight was flushed from a small pond on the outskirts of the swamp. During the last week of the party's stay, July 7-13, they became more common in the swamp itself. They breed in colonies with Egrets and other Herons. In 1910 they nested with Egrets on Minne's Lake. The following summer they resorted to the same place, but were fewer in number. For years they have roosted in cypress 'heads' on Floyd's Island Prairie, to and from which they were seen going morning and evening. These flocks are said to consist

sometimes of a single file of two or three hundred birds, while at other times they fly in a V-formation like Geese. The natives speak of 'Brown Curlews' which often fly and feed apart from the white forms. They also designate some brown and white ones as 'Pied Curlews' or 'Black-pied Curlews,' which roost with the other two. These are doubtless the younger phases of the one species. The hunters eat these 'Curlews' either 'stewed like chicken' or fried as are Wood Ibises.

4. **Mycteria americana.** WOOD IBIS; 'Flinthead'; 'Ironhead'; 'Mulehead'; 'Baldhead'; 'Wood Gannet.'—Fairly common. It is said that in dry weather the Wood Ibises occasionally resort to Billy's Island in flocks of one or two hundred. At such times the temporary pools in which killfishes are stranded prove enticing feeding grounds, as do the small cypress ponds on the islands. On May 30 two individuals were recorded flying over Honey Island, on the south edge of which the species has formerly roosted. On June 18 four of these remarkably fine birds circled and circled over a colony of Little Blue Herons, revealing from time to time in their turns the sheen of their backs. While a few were seen in May and June, they began in July to assemble in flocks. In descending the Suwannee on July 13, our party flushed flock after flock until 200 or more birds were sailing overhead. The members of the party observed that while rounding a bend in the river, they would hear a resounding noise like some one pounding on a hollow stump, and in every case the apparent cause was a Wood Ibis. The appearance of the birds when soaring very high in the air is Buzzardlike.

This species is considered a game bird, and is eaten whenever it can be secured. The native recipe is: 'Cut the breast crosswise; dip it in a little flour; wet it up; pack it; and then fry it.'

5. **Botaurus lentiginosus.** BITTERN; 'Marsh Hen.'—Uncommon. On June 17 we flushed our only 'Marsh Hen' along the Suwannee. It is said to frequent the prairies.

6. **Ardea herodias wardi.** WARD'S HERON; 'Po' Job'; 'Po' Jo'.—Fairly common. Generally distributed on the prairies and along the water-courses, and frequently seen flying over the wooded portions of the swamp. They were most common on Floyd's Island Prairie, where several were recorded on May 21 and 22, and a dozen more on June 25-27. This has been a favorite roosting place for several years. At dusk on June 25 and 26 we observed several birds coming into the prairie for the night. Here, on May 22, a nest with one well-grown young was located in a cypress 'head' some 60 or more feet above the water. Along the Suwannee River numbers were seen, and on June 18 several were found in a large colony of the Little Blue Herons on the west of the river. Here a nest was espied in a pine tree at least 70 or 80 feet above the water. The natives pronounced the 'Po' Job,' good eating; but when we tried a young one, all agreed that it was too bitter for our tastes.

7. **Herodias egretta.** EGRET; 'Plume-bird'; 'Big White Plume-bird'; 'White Crane.'—Formerly common. On May 20 Mr. Bryant Lee